

WHAT IS CLAIMED IS:

1. A film comprising:

a first layer comprising styrene butadiene copolymer;

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a second layer comprising a cyclic olefin and disposed on said first layer;
and

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a third layer comprising styrene butadiene copolymer and disposed on said
second layer as an outermost layer of said film,

wherein said first and third layers are substantially free of cyclic olefin and
said second layer is substantially free of styrene butadiene copolymer.

15 2. A film as set forth in Claim 1, wherein said film is substantially free of
halogens.

3. A film as set forth in Claim 1, wherein said first, second, and third layers are
extruded simultaneously.

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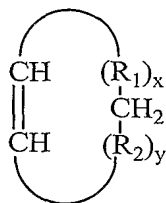
4. A film as set forth in Claim 1, wherein said second layer is disposed in contact
with said first layer.

5. A film as set forth in Claim 4, wherein said third layer is disposed in contact
25 with said second layer.

6. A film as set forth in Claim 1, wherein said third layer is disposed in contact
with said second layer.

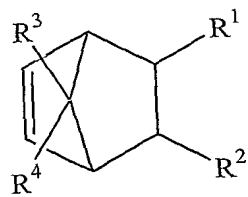
30 7. A film as set forth in Claim 1, further comprising an intermediate layer
disposed between said first and second layers.

8. A film as set forth in Claim 7, further comprising a second intermediate layer disposed between said second and third layers, wherein said second intermediate layer is the same as said intermediate layer.
- 5 9. A film as set forth in Claim 1, further comprising an intermediate layer disposed between said second and third layers.
10. A film as set forth in Claim 1, wherein said styrene butadiene copolymer comprises the reaction product of:
- 10 a styrene monomer; and
- 1,3-butadiene.
- 15 11. A film as set forth in Claim 1, wherein said cyclic olefin comprises the general structure:

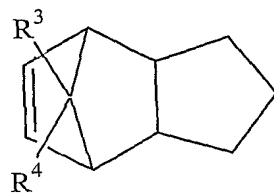


- wherein each of R_1 and R_2 independently comprise one of a hydrogen and a hydrocarbon; and
- 20 wherein x and y independently comprise an integer less than or equal to 10.
12. A film as set forth in Claim 1, wherein said cyclic olefin is selected from one of the general structures:

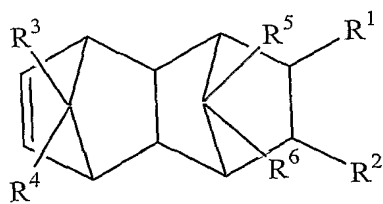
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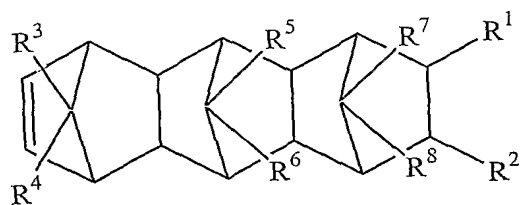
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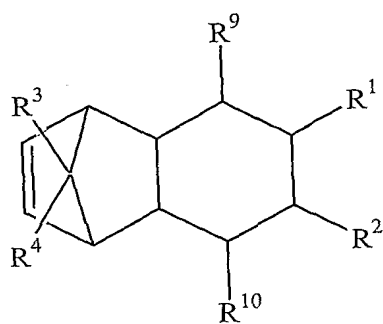
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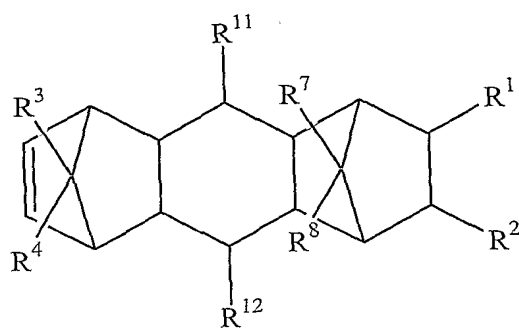
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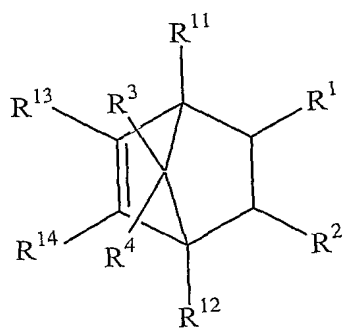


(E),

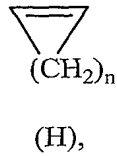


(F),

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(G),



5 wherein each of R¹ through R¹⁴ independently include one of an aryl group, and alkyl group, a halogen, and a hydrogen; and

wherein n includes an integer less than or equal to 10.

10 13. A film as set forth in Claim 12, wherein said cyclic olefin comprises norbornene.

14. A film as set forth in Claim 1, wherein said cyclic olefin comprises at least one pendant organic group.

15 15. A film as set forth in Claim 1, wherein said cyclic olefin comprises a cyclic olefin copolymer.

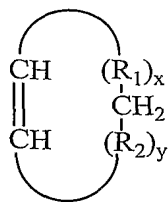
16. A film as set forth in Claim 15, wherein said cyclic olefin copolymer comprises the interaction product of:

20 said cyclic olefin; and

a cross-linker.

25 17. A film as set forth in Claim 16, wherein said cross-linker is selected from the group of alkanes, alkenes, alkynes, and combinations thereof.

18. A film as set forth in Claim 15, wherein said cyclic olefin copolymer comprises the general structure:



wherein each of R_1 and R_2 independently comprise one of a hydrogen and a hydrocarbon; and

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wherein x and y independently comprise an integer less than or equal to 10.

19. A film as set forth in Claim 15, wherein said cyclic olefin copolymer comprises norbornene.

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20. A film as set forth in Claim 15, wherein said cyclic olefin copolymer comprises at least one pendant organic group.

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21. A film as set forth in Claim 1, wherein said film has a density of from 0.98 to 1.03 g/cm³.

22. A film as set forth in Claim 1, wherein said film has a peel strength of greater than 1.0 lbs_f/in. as determined by ASTM D-903.

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23. A film as set forth in Claim 1 having a water vapor transmission rate of from 0.20 to 3.00 g/m²/ 24 hrs. as determined by ASTM F-1249.

24. A film as set forth in Claim 1 having a light transmission of from 88 to 93 percent as determined by ASTM D-1003.

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25. A film as set forth in Claim 1 having a haze of from 2 to 6 percent as determined by ASTM D-1003.

26. A film as set forth in Claim 1, wherein said first layer has a thickness of from about $25\mu\text{m}$ to about $205\mu\text{m}$.
27. A film as set forth in Claim 1, wherein said second layer has a thickness of
5 from about $75\mu\text{m}$ to about $205\mu\text{m}$.
28. A film as set forth in Claim 1, wherein said third layer has a thickness of from about $25\mu\text{m}$ to about $205\mu\text{m}$.
- 10 29. A pharmaceutical package comprising:
- a base layer;
- a sealant layer disposed on said base layer; and
15 a blister disposed on said sealant layer and formed from a film comprising:
- a first layer comprising styrene butadiene copolymer;
- 20 a second layer comprising a cyclic olefin and disposed on said first layer; and
- a third layer comprising styrene butadiene copolymer and disposed on said second layer as an outermost layer of said film, wherein
25 said first layer and third layers are substantially free of cyclic olefin and said second layer is substantially free of styrene butadiene copolymer.
30. A pharmaceutical package as set forth in Claim 29, further comprising a
30 pharmaceutical product disposed within said blister.

31. A pharmaceutical package as set forth in Claim 29, wherein said sealant layer is disposed in contact with said base layer.
32. A pharmaceutical package as set forth in Claim 31, wherein said blister is
5 disposed in contact with said sealant layer.
33. A pharmaceutical package as set forth in Claim 29 wherein said blister is disposed in contact with said sealant layer.
- 10 34. A pharmaceutical package as set forth in Claim 29, wherein said base layer comprises aluminum.
35. A pharmaceutical package as set forth in Claim 29, further comprising a lacquer layer disposed on said base layer and sandwiching said base layer
15 between said lacquer layer and said sealant layer.
36. A pharmaceutical package as set forth in Claim 35, further comprising an interior layer disposed between said lacquer layer and said base layer.
- 20 37. A pharmaceutical package as set forth in Claim 29, further comprising an interior layer disposed between said base layer and said sealant layer.
38. A pharmaceutical package as set forth in Claim 29, further comprising an interior layer disposed between said sealant layer and said blister.
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39. A pharmaceutical package as set forth in Claim 29, wherein said film has a water vapor transmission rate of from 0.20 to 3.00 g/m²/ 24 hrs. as determined by ASTM F-1249.
- 30 40. A pharmaceutical package as set forth in Claim 29, wherein said film has a light transmission of from 88 to 93 percent as determined by ASTM D-1003.

41. A pharmaceutical package as set forth in Claim 29, wherein said film has a haze of from 2 to 6 percent as determined by ASTM D-1003.

42. A method of making a film, said method comprising the steps of:

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a) forming a first layer comprising styrene butadiene copolymer;

b) forming a second layer comprising a cyclic olefin on the first layer;
and

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c) forming a third layer comprising styrene butadiene copolymer on the second layer as an outermost layer of the film,

wherein the first and third layers are substantially free of the cyclic olefin and
15 the second layer is substantially free of styrene butadiene copolymer.

43. A method as set forth in Claim 42, wherein the step of forming the first layer comprises extruding the first layer, the step of forming the second layer comprises extruding the second layer, and the step of forming the third layer
20 comprises extruding the third layer.

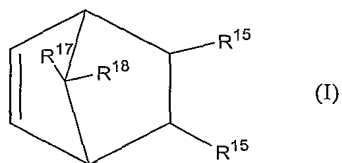
44. A method as set forth in Claim 43, wherein the first, second, and third layers are simultaneously extruded.

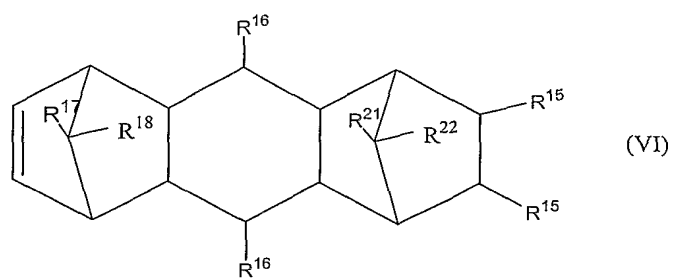
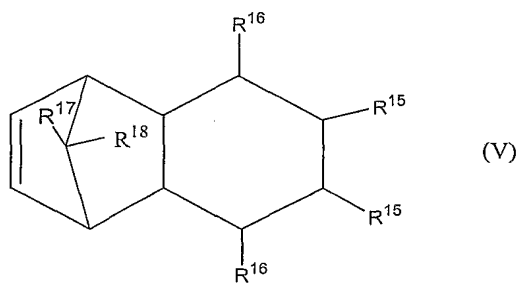
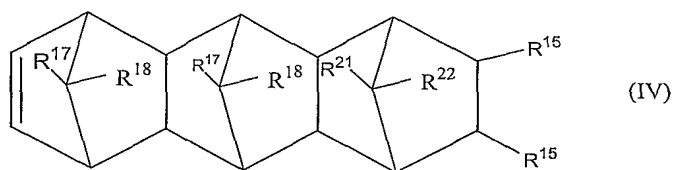
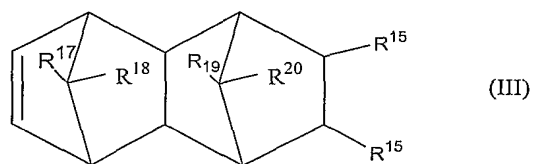
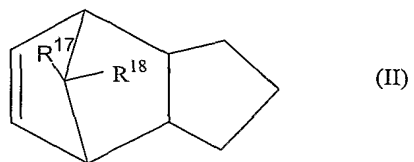
25 45. A method as set forth in Claim 42, further comprising the step of melt-bonding the first, second, and third layers.

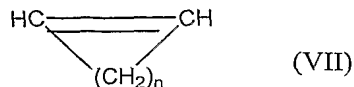
46. A method as set forth in Claim 42, wherein the film is substantially free of halogens.

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47. A method as set forth in Claim 42, wherein the second layer is formed in contact with the first layer.
48. A method as set forth in Claim 47, wherein the third layer is formed in contact
5 with the second layer.
49. A method as set forth in Claim 42, wherein the third layer is formed in contact with the second layer.
- 10 50. A multilayer film comprising:
- a styrene-butadiene block copolymer layer; and
- a cyclo-olefin copolymer layer which is directly melt-bonded to the
15 styrene-butadiene block copolymer layer.
51. The multilayer film of Claim 50, wherein said cyclo-olefin copolymer layer consists essentially of a cyclo-olefin copolymer.
- 20 52. The multilayer film of Claim 50, wherein said cyclo-olefin copolymer incorporates the residue of (i) the polycyclic structure of formula I, II, III, IV, V or VI, or (ii) the monocyclic structure of the formula VII:







wherein R^{15} , R^{16} , R^{17} , R^{18} , R^{19} , R^{20} , R^{21} and R^{22} are the same or different and
 5 are H, a C_6 - C_{20} -aryl or C_1 - C_{20} -alkyl radical or a halogen atom, and n is a
 number from 2 to 10.

53. The multilayer film of Claim 52, wherein said cyclo-olefin copolymer
 10 includes the residue of ethylene or propylene.
54. The multilayer film of Claim 53, wherein said cyclo-olefin copolymer
 incorporates the residue of norbornene.
55. The multilayer film of Claim 54, wherein said cyclo-olefin copolymer is a
 15 copolymer of norbornene and ethylene.
56. The multilayer film of Claim 55, wherein said cyclo-olefin copolymer consists
 essentially of the residue of norbornene and ethylene.
- 20 57. The multilayer film of Claim 56, wherein said cyclo-olefin copolymer
 comprises between about 10 and about 70 mol % norbornene residue and
 between about 30 and about 90 mol % percent ethylene residue.
- 25 58. The multilayer film of Claim 57, wherein said cyclo-olefin copolymer
 comprises between about 25 and about 45 mol % norbornene monomer and
 between about 55 and about 75 mol % ethylene monomer.
59. The multilayer film of Claim 50, wherein said styrene-butadiene block
 copolymer layer consists essentially of (i) at least about 50 wt. % styrene

residue; and (ii) from about 5 to about 50 wt. % butadiene residue; and (iii) optionally up to 10 wt. % other polymeric components.

- 5 60. The multilayer film of Claim 50, wherein the styrene-butadiene block copolymer consists of the residue of styrene and butadiene.
61. The multilayer film of Claim 50, wherein the styrene-butadiene block copolymer comprises from about 60 to about 90 wt. % styrene residue and from about 10 to about 40 wt. % butadiene residue.
- 10 62. The multilayer film of Claim 50, wherein the styrene-butadiene block copolymer comprises from about 70 to about 80 wt. % styrene residue and from about 20 to about 30 wt. % butadiene residue.
- 15 63. The multilayer film of Claim 50, wherein the cyclo-olefin layer is at least four times thicker than the styrene-butadiene layer.
64. The multilayer film of Claim 50, wherein the cyclo-olefin layer is at least six times thicker than the styrene-butadiene layer.
- 20 65. The multilayered film of Claim 50, wherein said film has at least three layers, and wherein the cyclo-olefin layer is present as a core layer between two styrene-butadiene layers.
- 25 66. The multilayer film of Claim 50, wherein said styrene-butadiene layer is directly melt-bonded to the cyclo-olefin layer by co-extrusion.
67. The multilayer film of Claim 50, wherein said styrene-butadiene layer is melt-bonded to the cyclo-olefin layer by lamination.
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68. The multilayer film of Claim 50, wherein the cyclo-olefin layer is directly melt-bonded to the styrene-butadiene layer such that the layers exhibit a peel adhesion of at least about 0.5 lbf/in.
- 5 69. The multilayer film of Claim 50, wherein the cyclo-olefin layer is directly melt-bonded to the styrene-butadiene layer such that the layers exhibit a peel adhesion of at least about 1.0 lbf/in.
70. The multilayer film of Claim 50, wherein said film has a correlated haze of
10 less than about 5 % at a thickness of about 3 mm.
71. A method for making a multilayer film comprising co-extruding a styrene-butadiene block copolymer layer with a cyclo-olefin copolymer layer, such that the styrene-butadiene block copolymer layer is directly melt-bonded to the
15 cyclo-olefin layer.
72. The method of Claim 71, wherein said styrene-butadiene layer consists essentially of: (i) at least about 50 wt. % styrene residue; (ii) from about 5 to about 50 wt. % butadiene residue; and (iii) optionally up to 10 wt. % other
20 polymeric components.
73. The method of Claim 71, wherein said cyclo-olefin layer consists essentially of a cyclo-olefin copolymer.
- 25 74. The method of Claim 71, further comprising extruding the cyclo-olefin layer at a polymer exit temperature of about 255°C to about 275°C, and extruding the styrene-butadiene layer at a polymer exit temperature of about 210°C to about 230°C.
- 30 75. Blister packaging having a thermoformed blister sheet defining one or more domed receptacle portions, wherein the blister sheet is thermoformed from a

multilayer film which includes a styrene-butadiene block copolymer layer that is directly melt-bonded to a cyclo-olefin copolymer layer.

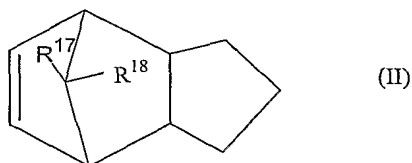
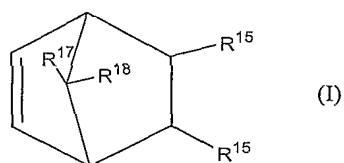
76. The blister packaging of Claim 75, wherein said domed receptacle portion
5 contains tablets, capsules, pills, caplets or the like.

77. The blister packaging of Claim 75, wherein said domed receptacle portion
contains a product selected from the group consisting of pharmaceutical
products, medicinal products, vitamins, nutritional supplements, and
10 confections.

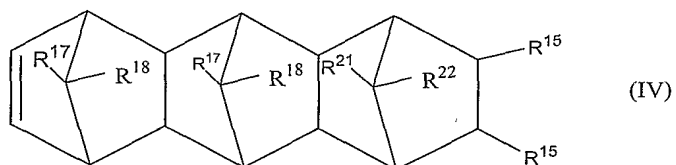
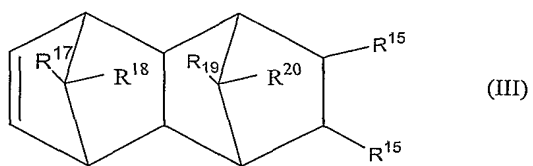
78. A multilayer film comprising:

a styrene-butadiene copolymer layer; and
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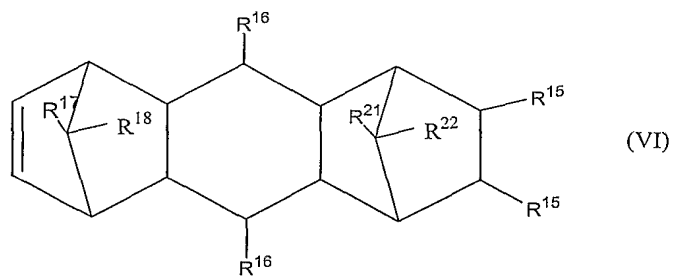
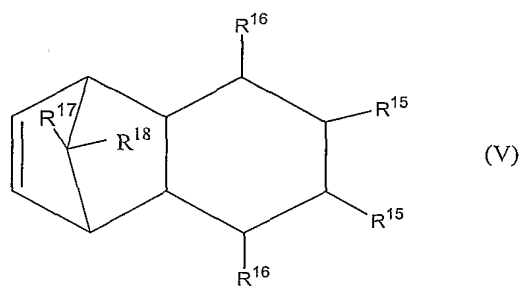
a cyclo-olefin copolymer layer which is directly melt-bonded to the
styrene-butadiene copolymer layer, wherein said cyclo-olefin copolymer
incorporates the residue of (i) the polycyclic structure of formula I, II, III,
IV, V or VI, or (ii) the monocyclic structure of the formula VII:
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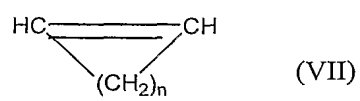
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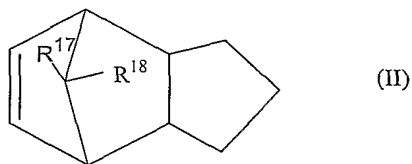
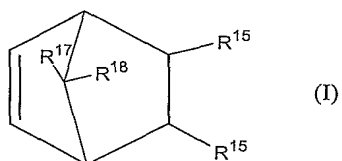


wherein R^{15} , R^{16} , R^{17} , R^{18} , R^{19} , R^{20} , R^{21} and R^{22} are the same or different and are H, a C_6 - C_{20} -aryl or C_1 - C_{20} -alkyl radical or a halogen atom, and n is a number from 2 to 10.

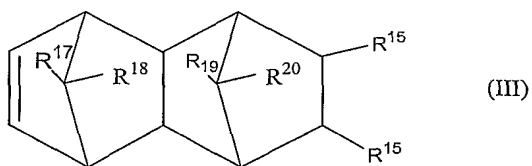
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79. A method for making a multilayer film comprising co-extruding a styrene-butadiene copolymer layer with a cyclo-olefin copolymer layer, such that the styrene-butadiene copolymer layer is directly melt-bonded to the cyclo-olefin layer, wherein the cyclo-olefin copolymer incorporates the residue of (i) the polycyclic structure of formula I, II, III, IV, V or VI, or (ii) the monocyclic structure of the formula VII:

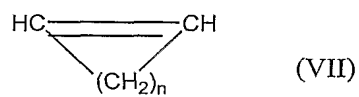
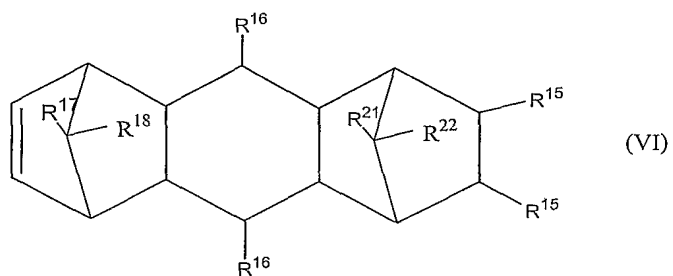
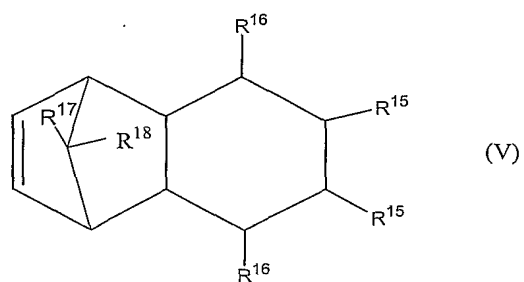
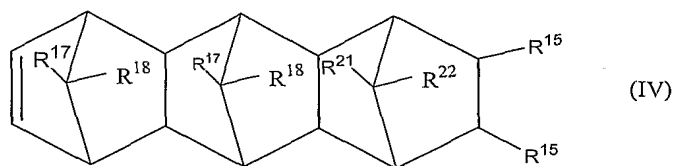
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wherein R^{15} , R^{16} , R^{17} , R^{18} , R^{19} , R^{20} , R^{21} and R^{22} are the same or different and are H, a C_6 - C_{20} -aryl or C_1 - C_{20} -alkyl radical or a halogen atom, and n is a number from 2 to 10.